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The Development of Weaning Practices Among Women of the Mombasa District, Its Effects on Children's Public Health Issues, and the Proposition of Intervention Plans

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Abstract

Breastfeeding is an unparalleled way of providing nourishment for the infant child in the first few years of life. A large body of literature supports that exclusive breastfeeding is optimal for the first 6 months of life, while complementary foods should be introduced in the diet 6 months and beyond. Mothers who inadequately wean their children are defined as having introduced complementary foods prior to 6 months post-natal age. The inclusive purpose of this study was to gain an understanding of inadequate weaning practices among patients and mothers of patients of the Muslim Education and Welfare Association Medical Centre (MMC) and to propose specific intervention plans for the MMC so that the education of its staff and mothers concerning adequate weaning methods and proper breastfeeding could be maintained or advanced for the improvement of infant and child health statuses in the District. The study took place in the Mombasa District at the MMC with two additional interviews of midwives in the region. A total of 59 mothers and 10 health professionals were interviewed; one interview was discarded for the final analysis. The study findings illustrate that 65% of mothers of the sample cohort inadequately weaned their children and of this percentage 43% observed an increase in illness of the weanling. Various factors were found to have influenced the mothers' decisions to wean. Based on the suggested need for intervention methods from the study findings, plans were proposed to the MMC at the end of the study in hopes of increasing the public health of infant and child patients at the Centre. The study findings were further confirmed through the interviews with health professionals who similarly noted a correlation between inadequate weaning and poor infant health. Additional research is recommended to confirm the findings of this study; however, according to the present observations, a correlation exists between inadequate weaning practices and the decreased health statuses of infants and children.

Introduction

Breastfeeding and Complementary Feeding

Breastfeeding provides an unparalleled manner to supply complete and ideal nourishment for the infant child in the beginning of life. As well as the provision of food, breastfeeding maintains added benefits including, but not limited to, bonding between the mother and child, the transference of immune and anti-allergenic properties, lactational amenorrhea affording child spacing, the promotion of womb contractions following birth, and ease of availability and affordability (Cameron & Hofvander, ___). In consequence of these benefits, encouragement and education of breastfeeding have become national and international agendas within recent years. In aspirations to promote mother and infant health as well as national and international interventions for the endorsement of breastfeeding, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have worked together in convening meetings and presenting international recommendations (World Health Organization, 1981). These as well as additional efforts afforded to support breastfeeding globally further confirm the significance of breastfeeding.

Less than one hundred year ago, breastfeeding was the chief manner mothers utilized for feeding their infants. At this time, baby food industries had yet to introduce infant formulae to the market, so the survival of the child primarily depended on the provision of the mother's or a wet nurse's breast-milk (Cameron & Hofvander, ___). Thus, due to breast-milk's role in infant survival, it offered all the required nutrients of the infant. According to the WHO, exclusive breastfeeding for the first 6 months of life and continued breastfeeding with the addition of complementary feeding for up to 2 years of age and beyond is sufficient for maintaining a child's health status (World Health Organization, 2000-2004). Up-to-date there are no alternative feeding methods that offer nourishment as complete as breast-milk for the infant child. Breast-milk provides all eight essential amino acids as wells as histidine in the proper portions and availability for efficient utilization in the body. This is in contrast to cow's milk and many infant formulae, which afford a poor supply of some essential amino acids as well as a low percentage of free or available amino acids (Ebrahim, 1983). In addition, breast-milk contains a high fat content, although variations occur depending on the mother's diet, and numerous protective

agents such as immunoglobulins, lactoferrin, lymphocytes, and macrophages (Ebrahim, 1983). These agents allow for protection against many life-threatening illnesses including gastrointestinal infection (diarrhoeal disease) and *Escherichia coli*. Furthermore, one previous study demonstrated breast-milk's added benefits in reducing the risks of food allergies and prevention of type 1 diabetes (Secker & Zlotkin, 2002).

As well as the biological benefits, the psychological advantages afforded through breastfeeding are also key benefits to this feeding method. Due to the physical connection between the mother and child, the bond of affection is strengthened (Moosa, 1995). The suckling of the breast by the baby and the en face position of breastfeeding are physically intimate acts, which help to encourage mother-infant bonding. Notably, it has been found that mothers separated from their infants for the critical imprinting post-partum period and consequently unable to breastfeed have a higher occurrence of child rejection of the mother and child abuse incidences (Ebrahim, 1983).

Breastfeeding also is advantageous because of its easy accessibility and affordability. In contrast to the use of cow's milk and infant formulae, which often have to be purchased and fed through a bottle or cup that may not be hygienically clean, breast-milk is free, sanitary, and readily available. As the trend has shifted in developing nations from exclusively breastfeeding to the introduction of infant formula or cow's milk within the first 6 months of life, a simultaneous rise in malnutrition and diarrhoeal disease has resulted, oftentimes a consequence of unhygienic feeding tools or unclean water supplies (Ebrahim, 1983). Additionally, the cost of breast-milk substitutions places a great financial burden on many families, especially those in developing countries. As a result, mothers may use less than the recommended amount of formula powder so as to extend the supply. However, this can lead to an inadequate caloric and nutrient intake of the infant further promoting malnutrition.

In spite of all the added benefits of breastfeeding, some studies show that exclusive breastfeeding for more than 6 months may also increase malnutrition because, at this age, breast-milk is not enough to solely provide for the nutritional

needs of the infant (World Health Organization, 30 Nov 2006). Ideally, an infant should be exclusively breastfed for 6 months and then additional foods gradually introduced into the diet. This is known as complementary feeding or weaning. The introduction of new foods is a critical period when the child is often susceptible to diseases and illnesses. This is partly a result of the reduction in the provision of immunological factors from the breast-milk (Burns, 2001). Additionally, especially in developing countries where clean water supplies are not always available, the danger in transmission of enteropathogens in the food is high, which places the child at risk for diarrhoeal disease (Lanata, ____). Ensuring proper preparation, provision, and introduction of new foods is a vital factor in maintaining health.

The World Health Organization recommends a gradual weaning period from 6 months to 2 years (World Health Organization, 2000-2004). This allows for the child to still receive the benefits from breastfeeding, while also consuming the necessary nutrients from the complementary foods. Foods should be prepared adequately containing the required nutrients as well as appropriately with a suitable texture and temperature (World Health Organization, 30 Nov 2006). Without the knowledge of proper weaning practices as well as a perception of the child's hunger needs, malnutrition and illness may ensue. The weaning period is therefore a vulnerable time when the child should be attentively cared for and observed so as to maintain health.

A common misconception among mothers, especially in developing nations, is that the introduction of complementary foods prior to the recommended length of exclusive breastfeeding will certainly increase the child's weight and health. However, introduction of new foods causes the baby to suckle less because of a reduced need for breast-milk, which also leads to a decreased production of breast-milk (Klein, 1995). When the baby drinks less milk and starts to consume complementary foods, the infant is not only at risk for infection, but also at risk for weight loss and malnutrition, as previously noted, because of an inadequate caloric intake. A 2-3 month infant is estimated to consume 116 kcal/kg/day, while in contrast a 70kg adult consumes only 50 kcal/kg/day (Ebrahim, 1983). The high caloric needs of the infant necessitate consumption of a large volume of food to equal the energy dense breast-milk, which is on average 67kcal/dl for a full-term delivery infant (Ebrahim, 1983). Because most infants cannot consume the necessary volume of

weaning foods, the child may acquire a caloric and nutrient deficiency from the premature weaning. However, it should be noted that some bottle-fed infants do gain weight faster, but this is primarily due to overfeeding when a mother desires the infant to gain weight and can afford the incurred costs of commercial milk formula. Risk factors are associated with this practice though such as the development of obesity, hypertension, or coronary disease later in life (Dogramaci, ____).

Misconceptions such as the benefits of premature weaning have played a role in the reduction of breastfeeding among women. Additional contributing factors also include, but are not limited to, the following: feelings that the child does not consume sufficient amounts of breast-milk, tedious promotion of commercial milk products or infant formulae, economic factors such as an increase of working mothers, lack of knowledge and support for the breastfeeding mother, improper health care practices including separation of the mother and infant for extended periods of time following the birth, inappropriate training of medical professionals about breastfeeding and weaning, utilization of commercial milk formulae as a symbol of economic class, and adoption of Western beliefs such as immodesty of breastfeeding and negative changes to the mother's figure (Cameron & Hofvander, ____). These beliefs, realities, and misconceptions have all contributed to the decline of breastfeeding, which therefore has affected the health status of the infant and the mother, as well as the state of family and national resources.

As a result of the negative effects the aforementioned factors contributing to the decline of breastfeeding have played in the public health status of infants and children, this study was initiated and completed in the expectation of acquiring an improved understanding of the impact of inadequate weaning practices among mothers in the Mombasa District and the etiologies of such practices. The primary goal of this study was to gain an understanding of weaning practices at a medical center in the Mombasa District, so intervention plans could be proposed and initiated in the region so as to advance the knowledge of breastfeeding and complementary feeding to consequently appropriate practices of inadequate weaning.

Study Description

This study was carried out in the Mombasa District at the Muslim Education and Welfare Association Medical Centre (MMC). Additionally, two interviews were conducted with midwives in the region to acquire a supplementary understanding of breastfeeding and weaning based on their perspectives and practices. A total of 59 mothers who had children as outpatient clients at the MMC and 10 health care professionals including nurses, doctors, midwives, and a hospital matron were interviewed over a four-week period. The data was gathered and analyzed, then interpreted. The study was initiated to examine the development of weaning practices among women of the Mombasa District and the effects of these practices on the public health statuses of children in the District thus allowing for the development of intervention plans for inadequate weaning practices.

The necessity of this study was found on many levels. According to the medical staff at the MMC, mothers of patients at the Centre are weaning their infants as young as forty days post-natal age (Interview 1.8, 30 Nov 2006). This has negatively impacted the health of the infants causing an influx in diarrhea, weight loss, and inadequate weight gain (Interview 1.2, 20 Nov 2006). The MMC Matron, Swafiya Abdullah, stated that the Centre previously used a nutritionist to encourage mothers to breastfeed; however, the Centre no longer provides for the specialist (Interview 1.3, 20 Nov 2006). Insufficient staffing for follow-ups and provision of breastfeeding support has thus impacted the patients' health statuses and practices of the MMC. Furthermore, a study carried out from June 2005 through June 2006 by Dr. Jalab Ashraph in Mvita, Mombasa, the area surrounding the MMC, found only 22% of the sample size to breastfeed for 2 years complete, while of the remaining sample, 32% breastfed less than one year and 18% for less than 6 months. Such findings were followed by recommendations to provide antenatal clinic teaching for potential mothers, assistance of the mother immediately after delivery in breastfeeding her infant, and continual encouragement by nurses from the Maternal and Child Health Clinic (MCH) for mothers to breastfeed (Ashraph, 2006). As evident in this research, a need for intervention plans and the understanding of the causes for premature weaning and cessation of breastfeeding were found in the MMC area. The objectives of this study are consequently critical for the provision of intervention plans and are as follows.

Specifically, this project aimed to identify the development of parental reasoning in weaning their children, especially in weaning a child younger than six months post-natal age. Moreover, the study was created to examine the health status of the weaned or weaning child according to the World Health Organization's standards of weight for age and in relation to the presence of illness or disease. These examinations would then aid in identifying a correlation, if present, between inadequate weaning and poor health status of the child. In addition, this study aimed to determine the complementary foods provided for the child during the weaning process in order to establish a possible correlation between the provision of these foods and the health status of the weaned or weaning child. Interviews of health care professionals and midwives were planned to determine their perspectives and intervention efforts concerning inadequate weaning practices. This information could also be used to tailor specific intervention strategies to the MMC. The proposition of possible intervention plans, based on the relevant needs from the interviews of mothers and health professionals, was the final objective of the study. The inclusive aim of this research was to gain an understanding of weaning practices among patients of the MMC and to provide specific intervention plans for the Muslim Education and Welfare Association Medical Centre so that the education of the staff, patients, and patients' mothers concerning adequate weaning methods and proper breastfeeding could be maintained or advanced to improve the health status of the infants and children in the District.

Setting

The Mombasa District is the smallest of the six districts in the Coastal Province of Kenya. It encompasses four divisions, Mombasa Island, Kisauni, Likoni, and Changamwe, which jointly house a population of approximately 661,085. Of the four divisions, Mombasa Island is the smallest in land measurement containing only 21 square kilometers; however, this division is also the most developed and most densely populated. The Island also accommodates the most health facilities with the majority being privately owned. Of the 77 health facilities in the district, 34 are on the Island and 22 of the 34 facilities are privately owned, the remaining being Government of Kenya (GOK) Health and Municipal facilities. In the District, the doctor-population ratio of the GOK and Municipal hospitals is 12 to 100,000, which is below the national average of 15 to 100,000. The insufficient number of doctors as well as the poorly equipped government facilities owning to meager health services have proved to be health setbacks in the District (Mombasa District Development Plan, 1997-2001).

The Muslim Education and Welfare Association Medical Centre (MMC) is located within the Mombasa District and specifically on the Mombasa Island division. The Muslim Education and Welfare Association (MEWA) is a registered, charitable, and non-governmental organization, which started in 1985. One of the projects of MEWA is the operation and management of the MEWA Medical Centre, which was established in 1995 as an outpatient facility. Soon after its establishment, the need for inpatient services was recognized, so in 1997 the MMC became a fully-fledged hospital. Since its modest beginnings, the MMC has grown both in size and services offered. Today, the medical centre serves as a community-based hospital providing both inpatient and outpatient services as well as surgical, pediatric, laboratory and diagnostic, X-ray and scan, pharmacy, and recent Volunteer Counseling and Testing (VCT) services. It is home to 94 staff members including 3 full-time doctors, a clinical officer/anesthetist, hospital matron, and other medical and non-medical staff members and currently has a bed capacity of fifty-five. The Centre is managed by the Muslim community and eight board members of the MEWA Medical Board of Management of the MEWA Executive Committee. Additionally, the MMC is funded primarily from the philanthropy of individuals both nationally and internationally,

families, and Muslim communities and organizations. The MMC depends on these philanthropic offerings of others for its maintenance and operation and through these contributions continues to make endeavors towards its persistent development and expansion (MEWA Medical Center Profile of Serives, 2006).

This study was carried out at the MEWA Medical Centre (MMC), excluding the two interviews of midwives on Mombasa Island. The MMC operates a small Maternal and Child Health Clinic, which provides services for pregnant women and children. The clinic is primarily operated by nurses and provides services fives day a week, Monday through Friday, from 8:30am until 12:30pm. Monday, Wednesday, and Friday services are offered for child weigh-ins and antenatal checkups, while Tuesdays and Thursdays are child immunization days. During the time of the study solely one nurse and a hospital ward attendant ran the clinic, which stands as a small room on the side of the Centre with a closet and a restroom. The number of patients varies from day to day and the majority of patients are Muslim women and children.

The two midwives interviewed located their services in downtown Mombasa on the Island division. One midwife operated a small clinic, which frequently had women entering and exiting for services, while the other midwife offered services from within her private residence. Both midwives were Muslim women who have provided their services for several years. The purpose of these interviews was to gain a brief understanding of breastfeeding and weaning outside of the hospital setting but still within Mombasa Island.

In consideration of the setting for this study, one aspect that should not be disregarded due to its impact on the findings and environment is the strong presence of the Islamic faith amongst the women and professionals interviewed. The significance results primarily from the effects of the faith on Muslims' beliefs about breastfeeding. To undervalue the importance of breastfeeding in the Islamic faith would be a disfavor because not only is breastfeeding considered a duty of the mother, but also a reason underlying the offering of love and kindness from her children (Moosa, 1995). The Holy Qur'an presents specific recommendations concerning breastfeeding, which, evident in this study, play a role in the overall length of breastfeeding. In reference to breastfeeding, the Holy Qur'an states:

> And We have enjoined on man (To be good) to his parents: In travail upon travail Did his mother bear him, And in years twain Was his weaning: (Hear the command) “Show gratitude to me and to thy parents: To me is (thy final) Goal.” Surah 31:14 (Ali, 1934)

Additionally, the Holy Qur’an clearly encourages a mother to suckle her child for two years as long as the child desires to complete the breastfeeding period (2:233) (Ali, 1934). In the Islamic community, the birth of an infant is cherished and breastfeeding is considered the right manner in which to nourish a child (Haneef, 1985). Therefore, a mother should not simply choose to discontinue breastfeeding in the absence of an explanation, but should seek godliness in making the decision (Ali, 1934).

As apparent, the Islamic faith maintains specific views of breastfeeding and the period of time for which a mother should breastfeed. Lacking in the Holy Qur’an are specific instructions about when to introduce complementary foods. This, therefore, has enabled mothers to independently choose when to initiate the weaning process, which consequently varies from household to household. The presence, however, of Islamic influences within this study is clear, especially following analysis of the complete breastfeeding period and also occasionally in explanations for the discontinuation of breastfeeding.

See Appendix 1 for references in and commentary of the Holy Qur’an in relation to breastfeeding and weaning.

Methodology

This study was performed from November 10 through December 5 in the Mombasa District, Mombasa Island division. Dr. Jalab Ashraph, a general practitioner in the Mombasa Island division, made available access to the Muslim Education and Welfare Association Medical Centre. All interviews of mothers and additionally three nurses were carried out at the Maternal and Child Health Clinic (MCH) at MEWA Medical Centre (MMC). Initially interviews of the mothers were performed Monday through Friday from 8:30am until 12:30pm. However, due to a scarce amount of mothers receiving services on Monday, Wednesday, and Friday, interview days were limited to Tuesdays and Thursdays during the same hours following the first week of interviews. Mothers were interviewed for approximately 10 to 20 minutes each during the immunization check-up of their child. Translation from Kiswahili to English was provided when necessary by the nurse on duty. A majority of the interviews required translation.

In addition to the MCH clinic interviews, interviews were also obtained from the Matron of the MMC, pediatric and maternity ward nurses, one doctor, and two midwives. One formal and one informal interview were carried out with the hospital matron. The pediatric and maternity ward nurses were interviewed during various shifts. Arrangements were made to interview the nurses during their morning, afternoon, and evening shifts at 10:00am, 2:30pm, and 9:00pm respectively. One doctor associated with the MMC was interviewed during office hours at his private office and two midwives were interviewed, one at her private residence and another at her clinic during clinic hours. The midwives' interviews were arranged through a contact student.

Prior to all the interviews, two unique questionnaires were created for the interviews with mothers and health care professionals (see Appendices 2 and 3). Questions were asked in the apparent order and translated into Kiswahili when necessary. All interviews were transcribed during the real time of the interview. Moreover, informed consent was received and an explanation of the study provided prior to questioning.

A total of 59 mothers were interviewed at the MCH clinic ranging from ages 18 to 45 years; however, one interview was discarded in the final data analysis due to insufficient and incomplete information. Two midwives and one doctor, along with five nurses, one from the pediatric ward, one from the maternity ward, and three from the MCH clinic, were interviewed. Furthermore, the matron of the MMC was interviewed along with a woman overseeing the food preparation and distribution at the MMC.

Transportation to and from interview sites included local public transportation and walking. Budget expenses for transportation, living accommodations and other study related activities were supplied by School for International Training.

On Monday, Wednesday, Friday, and weekends when interviews were not taking place, topical research and organization and analysis of interview data were carried out. Meetings with academic and research advisors were also arranged when necessary.

After the interview data was transcribed and analyzed, intervention plans for the MMC were written or organized and then proposed to the Centre Matron in the anticipation of improving the understanding of breastfeeding and weaning practices among the mothers of the region, but also of the medical staff at the MMC.

Discussion and Analysis of Study Findings

This study suggests that inadequate weaning practices are common among mothers of the sample cohort. Inadequate weaning is hereby defined as the introduction of complementary foods or abrupt cessation of breastfeeding prior to six months post-natal age, which is the optimal length for exclusive breastfeeding in order to accommodate for the nutritional needs of the infant according to the World Health Organization (2000-2004). Furthermore, in addition to the prevalence of inadequate weaning practices, the study findings suggest such behaviors appear to correlate to a large percentage of public health issues affecting weanlings. Not only has the length of time of exclusive breastfeeding declined in the Mombasa Island division in recent years, as noted by local health care workers, but also infant and child health statuses in correlation to this decline.

As indicated by the study results, 65% of the sample population practiced inadequate weaning, which represents the majority of the cohort (see Appendix 4, Chart 1). The practice of early weaning among women of the Mombasa District is supported by a previous study in the Mvita region carried out by a local doctor who observed a similar trend (Ashraph, 2006). The findings indicate that there are a number of factors that influenced the mothers of the sample population to wean their children. In this study, of the 65% who inadequately weaned, the greatest number of mothers claimed their initiation of weaning was a result of the child's dissatisfaction with exclusive breastfeeding (see Appendix 4, Chart 5). While additional research is necessary to understand why the mothers made the assumption that their infant was not satisfied with breastfeeding alone, many mothers did note their assumptions were based on constant or abnormal crying of the infant. However, in contrast to the mothers' perspectives, a large body of literature has investigated and found that exclusive breastfeeding for 6 months post-natal age is not only adequate for the nutritional needs of the child, but also carries a number of additional benefits. Therefore, the 35% of mothers who introduced complementary foods prior to 6 months of age due to the child's lack of satisfaction in breast-milk alone, although they likely observed hunger in their infant, may have lacked sufficient knowledge about breastfeeding encouraging them to discontinue exclusive breastfeeding. When an infant's nutritional needs increase or alter during the first six months of life, most

notably during the first 10-14 days, 5-6 weeks, and 3 months after the birth, the breast-milk also increases in volume or changes in composition (Klein, 1995). Although, in order for the breasts to produce an increased volume of milk, the mother must be aware of the infant's appetite needs and feed the infant when signs of hunger are presented. If this occurs, then the mother's milk volume will alter within two days to satisfy the infant's needs; conversely, if the mother chooses to introduce complementary foods during this period, then the weanling's need for breast-milk will decrease and the milk will not increase in volume (Klein, 1995). The study findings suggest that the mothers of the sample cohort who inadequately weaned their children were either unaware of or chose to disregard the information concerning the increase in the release of a mother's milk with attentive, exclusive breastfeeding. Thus, additional education, counseling or support of the breastfeeding mother would advocate a change in this behavior, a significant contributing factor in premature weaning.

In addition to the infant's dissatisfaction in exclusive breastfeeding, the infant's opposition to suckling was a large influence of inadequate weaning practices expressed by mothers of the sample cohort. The refusal of the child to suckle also correlates to a negative impact on infant health. Of the children who refused to suckle, with the inclusion of those adequately and inadequately weaned, 63% observed an increase in illness of the weanling. Furthermore, of only those who were inadequately weaned and refused to suckle, 58% experienced an increase in illness. This impact on health, which, according to the present observations, includes the increase or presence of diarrhea, constipation, and fever, may be a result of the sudden change in diet, which is harsh on the infant's digestive system. Additionally, a sudden lack of immunological factors, various nutrients, and a high caloric intake from the breast-milk due to abrupt cessation of breastfeeding suggests that the infant may be more susceptible to illness, especially when the body does not gradually make the transition from breast-milk to complementary foods. One health professional noted that if adequate amounts of milk are produced, the infant is not ill, and the infant is not consuming complementary foods, then the child should have little or no reason to refuse milk from the breasts (Interview 1.3, 20 Nov 2006). Even so, nearly a quarter of the mothers who inadequately weaned claimed their influence was a result of the infant's refusal to suckle. Possible explanations for this influence

include, but are not limited to, inaccurate accounts of the mothers in expressing influences to early weaning, improper breastfeeding techniques, or illness of the child. Although education of health professionals and further teaching of the mothers about breasting may positively affect this negative influence on weaning, further studies are necessary to understand the explanation of the infant's refusal of breast-milk so appropriate intervention plans can be proposed.

Of the influential factors on inadequate weaning practices, pregnancy of the mother and the mother's desire for the child to grow larger or faster individually accounted for nearly one out of every six explanations for weaning. Both of these pressures, however, are results of cultural traditions or misconceptions and, according to the present observations, seem to have a correlation to poor health of the infants. A few mothers claimed their religion, notably the Islamic faith, discouraged them from breastfeeding while pregnant because the breast-milk should be reserved for the child in the womb. One of the midwives interviewed affirmed this was a common misconception amongst many her clients as well (Interview 1.4, 27 Nov 2006). However, this belief is not confirmed in the Holy Qur'an. The Holy Qur'an encourages all mothers to breastfeed for a period of two years; nevertheless, only 17 of the sample cohort of 52 Muslim mothers followed the Holy Qur'an's encouragement and breastfed their infants for a total period of two years. Moreover, 10 of the remaining 35 who did not breastfeed for 2 years complete abruptly stopped breastfeeding because of pregnancy. Most mothers interviewed did not provide a detailed explanation for their decision to discontinue breastfeeding upon pregnancy, but the midwife, also a Muslim mother, argued that there is a belief among the Swahili people that breast-milk curdles when a woman becomes pregnant, though no literature confirms this belief (Interview 1.4, 27 Nov 2006). The influence to discontinue breastfeeding while pregnant is seen in many traditional societies and is one of the main factors contributing to abrupt cessation of breastfeeding (Ebrahim, 1983). The impact on health is similar to that as previously discussed with infant refusal to breastfeed. Because of the abrupt change in diet, many children of the sample cohort had a correlated increase in illness. Of the women in this study who discontinued breastfeeding due to pregnancy, 64% saw an increase in illness of their infant ranging from diarrhea to fever to loss of appetite, also referred to as infant anorexia. Due to these negative health effects, the traditions and misconceptions of

the sour milk and stealing of nourishment from the fetus is currently being addressed by some health professionals in the Mombasa District. Both midwives and nurses alike encourage mothers to breastfeed while pregnant (Interview 1.4, 27 Nov 2006; Interview 1.2, 20 Nov 2006). For this influential factor to be attended to and improved, interventions by health professionals concerning the realities of breastfeeding during pregnancy must be addressed and presented to mothers.

Another common misconception among the sample cohort is the belief that introduction of complementary foods will increase a child's weight and health status, as previously stated,. However, malnutrition or weight loss often results from weaning, especially in developing nations. Introduction of infant formula may cause diarrhea, which is frequently associated with malnutrition (Robinson, Lawler, Chenoweth, & Garwick 1986; Ebrahim, 1983). A previous study illustrated that in developing countries extended breastfeeding actually aids in the prevention of malnutrition, because diarrhea, dehydration, loss of nutrients, and high mortality rates are prevalent in developing nations where water sanitation is poor and improper weaning is practiced (Weaver & Elson, _____). Additionally, breast-milk's caloric density makes it difficult for complementary foods to provide for the caloric needs of the infant. According to interviews with the sample cohort, the vast majority of mothers feed their weanlings porridge, potatoes and Cerelac, a mixture of wheat cereals produced by Nestle. These three complementary foods not only lack the immunological benefits of breast-milk, but also are not rich in calories and have low fat and protein values. Actually, Nestle clarifies that Cerelac "is suitable as a complementary food for infants from six months onwards, when breast milk or formula alone no longer meet the baby's growing nutritional requirements. It is not a breast milk substitute" (Nestle, 2006). Though Nestle specifically recommends Cerelac for children six months of age and beyond, more than one third of the women in this study who inadequately weaned fed their infants Cerelac prior to six months of age. As evident, children who are weaned prematurely or inadequately are often vulnerable to malnutrition correlating to the nutritiously empty foods fed in complement or substitution of breast-milk. And, therefore, in contradiction to mothers who perceive weaning foods to increase infant weight or energy, weaning, especially premature weaning, can cause weight loss. Nurses of the MMC and midwives in the District who confirm this also noted in their patients a decrease in weight after

weaning (Interview 1.1, 17 Nov 2006; Interview 1.2, 20 Nov 2006; Interview 1.5, 27 Nov 2006). The opportunity to alter this misconception among mothers is provided for health care professionals routinely. Intervention efforts to educate mothers on the risks of premature weaning and introduction of complementary foods and the unique benefits of breastfeeding may alter this misconception among mothers of the study sample.

As well as the above-mentioned influences, a number of additional factors either directly or indirectly affect a mother's decision to wean her infant. One of these factors is the educational status of the mother. Although this study did not specifically focus on the correlation between education and weaning practices, therefore necessitating further studies to confirm the following observation, a tentative correlation between education status and weaning is observed in the sample cohort. As evident in Appendix 4, Chart 6, a higher percentage of mothers who inadequately weaned their infants had more advanced educations than those who adequately weaned their children. From the level of standard 7 through college, there are higher percentages of mothers who inadequately weaned their infants in comparison to those who adequately weaned. In contrast, a higher percentage of mothers who received no education or an education up to standard 6 was present among the sample cohort of mothers who adequately weaned their children. Although these statistics may initially appear disconcerting, because there is a certain expectation that those who are educated should be aware of appropriate breastfeeding methods or have resources available for access to such knowledge, this outcome may be the result of unanticipated factors. Education increases an individual's resources or accesses to higher paying jobs, which in two manners may directly affect breastfeeding of the infant. First, the mother may be more likely to work, therefore altering her breastfeeding schedule and secondly, a mother may have the available monetary resources to purchase infant formula. Because commercial milk formula more recently has become a status symbol, mothers who can afford to purchase this commodity may do so in an effort to demonstrate her higher economic status (Cameron & Hofvander, ___). As previously mentioned, however, the preliminary observations require further study for confirmation of the correlation between education status and weaning practices. If future studies reveal inconvenient breastfeeding schedules due to working hours or purchase of infant formula as a status

symbol are factors influencing inadequate weaning among the more educated populous, then intervention efforts should be made to address the educated mothers about the possibilities of breastfeeding during work, releasing milk prior to work to feed the infant or breastfeeding before and after work as often as possible. Also, mothers should be educated about the risks of introducing infant formula and complementary foods prematurely, notably the vulnerability of the infant to diarrhea or other illnesses, loss of immunological benefits, interruption of the mother-infant bond and an increase in financial expenses for the family.

As previously illustrated, the findings of this study suggest a correlation between inadequate weaning and poor public health among infants in the Mombasa District. This correlation is more directly observed in Appendix 1, Chart 8, which shows that 43% of mothers who inadequately weaned their children also noted an increase in illness. Of the mothers who observed an increase in illness and also inadequately weaned, the common cold, diarrhea, and fever, in order of prevalence, were most frequently observed; this trend also exists within the entire study cohort (see Appendix 4, Chart 4). A number of previous studies support the influx in illness following the initiation of weaning, many attributing the increase in illness to the nutritionally inadequate complementary foods and suboptimal feeding and hygienic practices (Dewey, ____; Lanata, ____; Slecker & Zlotkin, 2002). This study also confirms the prevalence of nutritionally inadequate complementary foods fed to the weanling, which include but are not limited to, porridge, potatoes, bread, rice, and Cerelac. Additional studies would be necessary to understand the hygienic practices in complementary food preparation in the Mombasa Island division.

In a further effort to determine the correlation between weaning and poor infant health status, the World Health Organization's standard age-weight chart was used to represent the ages and weights of children among the sample population. All weights and ages of the children adequately and inadequately weaned were recorded on the chart (see Appendix 6). Only the children whose weights were recorded at the time of interview were included in the analysis. Based on the recordings, however, there seems to be no or a very slight correlation between inadequate weaning and weight. A lack of the inclusion of height and gender in the recorded weights and ages may represent possible biases influencing the observations. Of the 63 children

charted, 40 were charted as inadequately weaned and 23 as being adequately weaned. Of the representative cohorts, 22% of those adequately weaned fell outside of the 50th percentile line for boys and 3rd percentile line for girls, while only 30% of those inadequately weaned fell outside the representative percentile lines. Although those inadequately weaned show a slightly higher percentage of weanlings weighing outside the standard percentiles, which may indicate a correlation between inadequate weaning, weight, and possibly health status, further studies are necessary with the inclusion of a larger cohort to confirm this observation. Additionally, height or length measurements and gender should be taken into consideration when recording and analyzing data in future studies so any biases, which may exist in such respects, can be limited.

Aside from the analysis of the representation of weights and ages on the World Health Organization chart, which contains biases, other prejudices in this study should be noted as observed through the interview processes. The vast majority of mothers interviewed did not speak English therefore requiring the interviews to be translated by the Maternal and Child Health Clinic nurse. Because of the nature of the interview questions, which inquired about the presence of and increase in illness of the interviewees' children, many mothers appeared to be hesitant in sharing information. One possible explanation for their hesitations, also confirmed by the MMC Matron, is the mothers' feelings of inadequacy as a guardian if they demonstrate their child was consistently ill or showed an increase in illness following the introduction of complementary foods. Sharing this with the nurse or even someone performing research may, from the mothers' perspectives, make them look poorly, so they may have withheld information. Another reason for this hesitancy is the lack of preparation of the mothers for answering the questions. According to the hospital matron, mothers in the community discuss what takes place at the clinic prior to their visit in order to prepare themselves to answer questions in a manner pleasing to the nurse or which makes them, as mothers, look good (Interview 1.3, 30 Nov 2006). Many of the mothers who answered "no" to the questions did so in a seemingly curt manner making it appear as if they did not want to or were not prepared to answer the asked question. Due to a lack of preparation, the mothers therefore may not have provided complete or accurate information. Furthermore, another bias to take into consideration is the limitation of the translation process. Because a translator relayed both the

questions and answers, the full meaning or accurate meanings of the questions and responses may not have been conveyed. This therefore may have affected the findings.

In addition to the interviews of and data gathered from the mothers of Mombasa Island, the interviews with medical personnel, specifically those of the MMC, provided an understanding of the present knowledge of the medical staff at the Centre. All health care workers interviewed have observed a decrease in the age at which mothers wean their children within recent years. Furthermore, the nurses of the Maternal and Child Health Clinic as well as of the pediatric and maternity wards claimed that they personally encourage mothers to breastfeed for long periods of time, although no specification was indicated by the interviewees on the length of time they encourage mothers to breastfeed. Additionally, in confirmation of the findings of this study, all health care workers of the Centre have observed negative health effects resulting from inadequate weaning practices among their patients. The illnesses most frequently observed due to poor weaning practices include diarrhea, malnutrition, low or loss of weight, vomiting, and infections. The interview findings also illustrate that all interviewees at the MMC believe additional efforts could be made to promote breastfeeding and proper weaning practices at the Centre. Responses include the following: continual encouragement for mothers to breastfeed, follow-ups at homes to ensure mothers are properly breastfeeding and weaning, support groups or teams for the breastfeeding mothers, and allowance of mothers to breastfeed directly after birth. The information gathered from these interviews allows for the tailoring of intervention plans for the MMC. Challenges may present themselves in the execution of intervention plans such as a lack of funds. These challenges will need to be addressed prior to or upon manifestation. The overall implementation of the plans is dependent on the cooperation of the staff of the MMC and the mothers' acceptance of the information provided.

In conclusion, the ramifications of this study are expansive. The opportunity to enrich the patients, both mothers and children alike, and the medical staff of the MMC with education and knowledge of proper weaning methods and breastfeeding techniques has been investigated. According to the present observations, the need for intervention is present in the region if the overall public health status of infants and

children is going to improve. Based on this study, a better understanding of the presence of inadequate weaning practices and the impact of these poor practices on child health has been attained. This understanding, resultantly, provides valuable knowledge necessary for the creation, proposition, and execution of intervention plans for the Centre. In accordance with the specific observations of the influences of the Islamic faith, educational status, Swahili traditions, and the changing culture in reference to the MMC, intervention plans were tailored for the specific use of the MMC (see Appendix 5 and Recommendations). The implementation of these intervention plans is, however, dependent upon the staff of the Centre; even so, not considering the implementation of intervention plans, this study provides valuable information in light of the public health status of infants and children and the weaning practices of mothers in the region as well as the correlation between infant health and weaning. Additionally, the knowledge of nurses and other medical staff members of the MMC gathered through personal interviews provides understanding in how intervention plans should be addressed to educate the medical personnel of the Centre.

Conclusion

Of the 58 interviews of mothers used in the data calculations, 37 mothers weaned their children prior to 6 months post-natal age. This represents the majority, or 65%, of the mothers interviewed, one mother being excluded because she had not initiated weaning for her 4-month-old infant. Moreover, the majority of mothers, or a raw count of 16, of those who inadequately weaned their infants, weaned at 4 months post-natal age, while the majority of mothers who adequately weaned, or a raw count of 17, weaned at 6 months post-natal age. Of the study cohort, another 25 mothers noted an increase in illness, 15 of whom also inadequately weaned their children. Additionally, the highest percentage of an increase in illness was noted among mothers who abruptly stopped breastfeeding for reasons including pregnancy and refusal of the child to suckle. Overall, the most common illnesses observed by mothers upon introduction of complementary foods were colds, diarrhea, and fever, while pneumonia, loss of appetite, constipation, and rashes were also observed in less frequency. The study findings suggest a correlation between weaning practices and infant health status.

This study also illustrates a number of factors contributing to the initiation of weaning and the cessation of breastfeeding. The majority of mothers for both the entire sample cohort and solely the mothers who inadequately weaned claimed they introduced complementary foods because the child seemed unsatisfied with breast-milk alone. The second most representative influence was due to the child's refusal to suckle. Additional, but observantly less common, factors affecting a mother's decision to wean include pregnancy, a desire for the child to grow larger, illness of the mother or child, doctors' recommendations, and work. Based on the data analysis, another possible influence observed was education status of the mother. A greater percentage of mothers with a higher level of education inadequately weaned their children than mothers with a lower education level. Likewise, a higher percentage of mothers with a lower level of education adequately weaned their children. Further studies are necessary to confirm the correlation between education level and weaning practices; however, based on this study, an apparent correlation exists.

No conclusive associations between age-weight standards of the World Health Organization and weaning practices were found in this study. Although a slightly higher percentage of children inadequately weaned weighed outside of the percentile lines, additional studies are needed to confirm a correlation to weaning practices and additional measurements including length or height and gender should be taken in consideration prior to drawing conclusions.

Interviews with health care professionals and midwives in the Mombasa District provided confirmation of the study findings. All personnel interviewed observed a decline in the weaning age of infants in the Mombasa Island division within recent years. Additionally, the health care staff of the MMC noted a decline in the health statuses of the inadequately weaned children especially evident due to diarrhea, weight loss, and malnutrition. All staff members provided suggestions for future intervention plans at the Centre and claimed that they personally make efforts to encourage mothers to breastfeed.

This study culminated in the provision of valuable information for the MEWA Medical Centre. Based on the negative influences of inadequate weaning on the public health status of infants and the regularity of the practice, the establishment of intervention plans and execution of the plans appears to be necessary for improving the infants' health statuses. The inclusive, broad goal of this project was to gain understanding of weaning practices among patients of the medical centre and thereby propose intervention plans to initiate the improvement of health status among the infants. In accordance with the findings of this study, an improved understanding has been gained and based on the recommendations, intervention plans proposed not only for the MMC staff, but also to address the expecting or mothers of patients at the Centre.

Recommendations

Recommendations for the MEWA Medical Centre Based on Study Findings

Based on the findings of this study, intervention plans for the medical staff and patients of the MEWA Medical Centre would appear to facilitate the improvement of infant health status in the region. Due to the misconceptions conveyed during the interviews among mothers of the sample cohort and the apparent lack of understanding about the benefits of breastfeeding, a flyer was created to meet the needs of the mothers concerning weaning practices and breastfeeding (see Appendix 5 for English and Kiswahili flyer translations). Because this study did not aim to implement and analyze the success of the proposed intervention methods, the initiative of the MMC staff is necessary for the execution of the plans. Nurses and other staff members should provide the proposed flyer or other breastfeeding and weaning information to mothers in the maternity ward or mothers of patients and expecting mothers at the MCH clinic to ensure that mothers gain a better understanding of breastfeeding, its benefits, and adequate weaning. All staff members should offer their time to read the flyer or relay relevant facts in the event that a mother is illiterate. Flyers should be available in both English and Kiswahili translations.

In addition to the above intervention plans aimed to address mothers, the medical staff of the MMC should also be thoroughly educated on breastfeeding and weaning so they can accurately present information to mothers and be available for questions. Although this study was not expansive enough to provide detailed intervention methods for the medical staff of the Centre, based on the interviews additional education of the staff would appear beneficial. The World Health Organization has extensive courses prepared to train staff members about breastfeeding and complementary feeding. It would be beneficial to offer these courses to maternity, pediatric, and Maternal and Child Health nurses at the MMC. The hospital matron or other administrative figure should administer of the course. To access the available director's training guides established by the World Health Organization, please visit the following address for the 'Breastfeeding Counselling: A training course' and the 'Complementary Feeding Counselling: A training course' guides:

http://www.who.int/nutrition/publications/infantfeeding/en/

Finally, previous studies illustrate that allowing mothers and infants to sleep together in hospital settings even when the infant or mother is ill as well as allowing the mother to breastfeed as soon as possible following the birth help to facilitate breastfeeding (Burns, Lovich, Maxwell, & Shapiro, 1997). Additionally, preventing representatives from commercial milk formulae companies to advertise at the Centre is essential in maintaining an environment aimed to support breastfeeding. Efforts as previously listed should be established and maintained at the MMC to help support mothers in breastfeeding their infants.

Recommendations for Future Research

Based on this study and the respective findings, future research is recommended for confirmation, clarification, and supplementation of the study findings. An additional study of complementary foods and its effects on infant public health based on type, sanitation efforts, preparation, and adequate amounts is recommended as well as a study specific to understanding the correlation between education and weaning practices among mothers in the region. Furthermore, following the implementation of intervention plans at the MMC, a study should be carried out to understand the effects of the plans on infant health status and the percentage of mothers who still inadequately wean. This study should also focus on methods for improving the implemented intervention plans or for providing new intervention plans. An additional study is also necessary to confirm or determine the correlation between age and weight in reference to the World Health Organization's standards and inadequate weaning practices. In addition, more information is needed to understand why mothers arrived at the conclusion that their infants were not satisfied with breast-milk alone prior to six months of age. Due to the considerable number of mothers who claimed this was an influence for them to initiate weaning, understanding this observation would be beneficial in the creation of intervention plans. Finally, a study to understand why infants refuse to suckle would be influential in addressing factors that effect inadequate weaning practices. Because approximately a quarter of the mothers of the sample cohort noted that an influence to cease breastfeeding was a result of their child's lack of suckling, addressing this issue may help to improve public health of the infants.

Recommendations for Repetition

After analyzing the methods and findings of this study, some alterations would be beneficial to decrease biases and further confirm the study conclusions. The use of a translated survey in addition to or substitution of a personal interview may help in encouraging mothers to share information they are unwilling to offer in a personal interview. A possible challenge to this method is the low level of education among much of the sample population making individual reading of the survey difficult or impossible. This problem would prevent utilization of a survey and require the use of a personal interview. However, in the event that a personal interview is necessary, the use of a translator who is not a medical nurse is recommended. In some interviews this appeared to interfere with the willingness of a mother to share her responses uninhibited. Even so, if the interviewer could speak the language of the interviewee, this would be ideal. Finally, studying mothers in the absence of a hospital setting may encourage honesty, especially when sharing information about illness.

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Interviews

Interview 1. Personal Interview. Mother. 17 Nov 2006.

Interview 2. Personal Interview. Mother. 17 Nov 2006.

Interview 3. Personal Interview. Mother. 17 Nov 2006.

Interview 4. Personal Interview. Mother. 17 Nov 2006.

Interview 5. Personal Interview. Mother. 17 Nov 2006.

Interview 1.1. Personal Interview. Nurse. 17 Nov 2006.

Interview 6. Personal Interview. Mother. 20 Nov 2006.

Interview 7. Personal Interview. Mother. 20 Nov 2006.

Interview 1.2. Personal Interview. Nurse. 20 Nov 2006.

Interview 1.3. Personal Interview. Matron. 20, 30 Nov 2006.

Interview 8. Personal Interview. Mother. 22 Nov 2006.

Interview 9. Personal Interview. Mother. 22 Nov 2006.

Interview 10. Personal Interview. Mother. 23 Nov 2006.

Interview 11. Personal Interview. Mother. 23 Nov 2006.

Interview 12. Personal Interview. Mother. 23 Nov 2006.

Interview 13. Personal Interview. Mother. 23 Nov 2006.

Interview 14. Personal Interview. Mother. 23 Nov 2006.

Interview 15. Personal Interview. Mother. 23 Nov 2006.

Interview 16. Personal Interview. Mother. 23 Nov 2006.

Interview 17. Personal Interview. Mother. 23 Nov 2006.

Interview 18. Personal Interview. Mother. 23 Nov 2006.

Interview 19. Personal Interview. Mother. 23 Nov 2006.

Interview 20. Personal Interview. Mother. 23 Nov 2006.

Interview 21. Personal Interview. Mother. 23 Nov 2006.

Interview 22. Personal Interview. Mother. 23 Nov 2006.

Interview 23. Personal Interview. Mother. 23 Nov 2006.

Interview 24. Personal Interview. Mother. 23 Nov 2006.

Interview 25. Personal Interview. Mother. 23 Nov 2006.

Interview 26. Personal Interview. Mother. 23 Nov 2006.

Interview 27. Personal Interview. Mother. 23 Nov 2006.

Interview 1.4. Personal Interview. Midwife. 27 Nov 2006.

Interview 1.5. Personal Interview. Midwife. 27 Nov 2006.

Interview 28. Personal Interview. Mother. 28 Nov 2006.

Interview 29. Personal Interview. Mother. 28 Nov 2006.

Interview 30. Personal Interview. Mother. 28 Nov 2006.

Interview 31. Personal Interview. Mother. 28 Nov 2006.

Interview 32. Personal Interview. Mother. 28 Nov 2006.

Interview 33. Personal Interview. Mother. 28 Nov 2006.

Interview 34. Personal Interview. Mother. 28 Nov 2006.

Interview 35. Personal Interview. Mother. 28 Nov 2006.

Interview 36. Personal Interview. Mother. 28 Nov 2006.

Interview 37. Personal Interview. Mother. 28 Nov 2006.

Interview 38. Personal Interview. Mother. 28 Nov 2006.

Interview 39. Personal Interview. Mother. 28 Nov 2006.

Interview 40. Personal Interview. Mother. 28 Nov 2006.

Interview 41. Personal Interview. Mother. 28 Nov 2006.

Interview 1.6. Personal Interview. Nurse. 29 Nov 2006.

Interview 1.7. Personal Interview. Nurse. 30 Nov 2006.

Interview 42. Personal Interview. Mother. 30 Nov 2006.

Interview 43. Personal Interview. Mother. 30 Nov 2006.

Interview 44. Personal Interview. Mother. 30 Nov 2006.

Interview 45. Personal Interview. Mother. 30 Nov 2006.

Interview 46. Personal Interview. Mother. 30 Nov 2006.

Interview 47. Personal Interview. Mother. 30 Nov 2006.

Interview 48. Personal Interview. Mother. 30 Nov 2006.

Interview 49. Personal Interview. Mother. 30 Nov 2006.

Interview 50. Personal Interview. Mother. 30 Nov 2006.

Interview 51. Personal Interview. Mother. 30 Nov 2006.

Interview 52. Personal Interview. Mother. 30 Nov 2006.

Interview 53. Personal Interview. Mother. 30 Nov 2006.

Interview 54. Personal Interview. Mother. 30 Nov 2006.

Interview 55. Personal Interview. Mother. 30 Nov 2006.

Interview 56. Personal Interview. Mother. 30 Nov 2006.

Interview 57. Personal Interview. Mother. 30 Nov 2006.

Interview 58. Personal Interview. Mother. 30 Nov 2006. (Discarded)

Interview 59. Personal Interview. Mother. 30 Nov 2006.

Interview 1.8. Personal Interview. Food Preparer. 30 Nov 2006.

Interview 1.9. Personal Interview. Nurse. 30 Nov 2006.

Interview 1.10. Personal Interview. Doctor. Continual.

Glossary of Terms

Amenorrhea: abnormal absence or suppression of menstruation
Antibody: any of a large number of proteins of high molecular weight that are produced normally by specialized B cells after stimulation by an antigen and act specifically against the antigen in an immune response, that are produced abnormally by some cancer cells, and that typically consist of four subunits including two heavy chains and two light chains -- called also *immunoglobulin*
Escherichia coli: Also abbreviated as *E. coli*; a straight rod-shaped gram-negative bacterium (*Escherichia coli* of the family Enterobacteriaceae) that is used in public health as an indicator of fecal pollution (as of water or food) and in medicine and genetics as a research organism and that occurs in various strains that may live as harmless inhabitants of the human lower intestine or may produce a toxin causing intestinal illness
Essential amino acid: any of various alpha-amino acids that are required for normal health and growth, are either not manufactured in the body or manufactured in insufficient quantities, are usually supplied by dietary protein, and in humans include histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine
Immunoglobulin: See Antibody
Lactoferrin: a red iron-binding protein synthesized by neutrophils and glandular epithelial cells, found in many human secretions (as tears and milk), and retarding bacterial and fungal growth
Lymphocyte: any of the colorless weakly motile cells that originate from stem cells and differentiate in lymphoid tissue (as of the thymus or bone marrow), that are the typical cellular elements of lymph, that include the cellular mediators of immunity, and that constitute 20 to 30 percent of the white blood cells of normal human blood
Macrophage: a phagocytic tissue cell of the immune system that may be fixed or freely motile, is derived from a monocyte, functions in the destruction of foreign antigens (as bacteria and viruses), and serves as an antigen-presenting cell

*The above definitions are direct citations from MedlinePlus, a service of the U.S. National Library of Medicine and the National Institutes of Health. The site was viewed on 3 Dec 2006 at http://www.nlm.nih.gov/medlineplus/mplusdictionary.html

Appendices

Appendix 1

Surah 46:15 We have enjoined on man kindness to his parents: In pain did his mother bear him, and in pain did she give him birth. The carrying of the (child) to his weaning is (a period of) thirty months. At length, when he reaches the age of full strength and attains forty years, He says, "O my Lord! Grant me that I may be grateful for thy favor which Thou hast bestowed upon me, and upon both my parents, and that I may work righteousness such as Thou mayest approve; And be gracious to me In my issue. Truly have I turned to Thee and truly do I bow (to Thee) in Islam.

Commentary 4790

The maximum period of breastfeeding (2 years) is again in accordance with the time that the first dentition is ordinarily completed in a human child. The lower milk incisors in the center come out between the 6^{th} and 9^{th} month, then come out the milk teeth at intervals, until the canines appear. The second molars come out at about 24 months, and with them the child has a complete apparatus of milk teeth. Nature now expects him to chew and masticate and be independent of his mother's milk completely. On the other hand, it hurts the mother to feed from the breast after the child has a complete set of milk teeth. The permanent teeth begin at the sixth year, and the second molars come at 12 years. The third molars are the wisdom teeth, which may appear at 18 to 20 years, or not at all.

Surah 31:14 And We have enjoined on man (To be good) to his parents: in travail upon travail did his mother bear him, and in years twain was his weaning: (Hear the command), "Show gratitude to Me and to thy parents: to Me is (thy final) Goal."

Commentary 3596

The set of milk teeth in a human child is completed at the age of two years, which is therefore the natural extreme limit for breastfeeding. In our artificial life the duration is much less.

Surah 2:333 The mothers shall give suck to their offspring for two whole years, if the father desires to complete the term. But he shall bear the cost of their food and clothing in equitable terms. No soul shall have a burden laid on it greater than it can bear. No mother shall be treated unfairly on account of her child nor father on account of his child, an heir shall be chargeable in the same way. If they decide on weaning, by mutual consent, and after due consultation, there is no blame on them. If ye decide on a foster mother for your offspring, there is no blame on you, provided ye pay (the mother) what ye offered, on equitable terms. But fear God sees well what ye do.

Commentary 266

By mutual consent they can agree to some course that is reasonable and equitable, both as regards the period before weaning (the maximum being two years) and the engagement of a wet nurse, or (by analogy) for artificial feeding. But the mother's privileges must not be curtailed simply because by mutual consent she does not nurse the baby. In a matter of this kind the ultimate appeal must be to godliness, for all legal remedies are imperfect and may be misused.

The above information can be found in the following reference:
Ali, A. The Holy Qur'an. Beirut: Ouloom Alqur'an Est, 1934.

Appendix 2:

Interview for mothers to determine the influences to wean and the health status of the weanling to evaluate a possible a correlation between health status and weaning practices.

Name:	Number of Children:
Age:	Level of Education:
Gender:	Marital Status:
Religion (optional):	Occupation:

1. What are the ages and weights (kg) of your children?

2. Did you breastfeed all your children? [] Yes [] No If yes, up to what age did you breastfeed each child? If no, why did you choose not to breastfeed one or all of your children?

3. Why did you choose to start the weaning process?

4. Over what period of time did you wean your child?

5. Did you ever feed your child complementary foods while still breastfeeding? [] Yes [] No If yes, what foods did you feed your child?

6. When you completely stopped breastfeeding, what diet did your child eat?

7. What sicknesses, please include colds, have your children had since their births (please list specific to child's name or age)?

8. Did you notice an increase in illness when your child(ren) was weaned as opposed to the time he or she was breastfeeding? [] Yes [] No

9. Additional Comments:

Appendix 3:

Interview for health care professionals and midwives to determine their knowledge of weaning behaviors within the District and intervention plans currently being executed.

Name:
Age:
Gender:
Religion (optional):

Level of Education:
Marital Status:
Occupation:

1. Have you observed a trend in the Mombasa District of children being weaned at younger ages than previous time periods? [] Yes [] No

2. If you have noticed a trend, what do you believe are the causes or influences of this trend?

3. At what post-natal age of the infant do you observe mothers to typically wean?

4. What effects are you aware of that negatively influence public health of the child when the child is prematurely weaned (less than 6 months) or improperly weaned (poor nutrition)?

5. What intervention methods are you personally aware of that have been implemented in Mombasa to encourage proper and prolonged breastfeeding?

6. Have personally made an effort to encourage mothers to breastfeed for extended periods?

7. What are possible intervention plans which you think would be beneficial in Mombasa to encourage mothers to breastfeed for longer periods of time and to properly wean their children?

8. Additional Comments:

Appendix 4:

Chart 1: Comparison of Inadequately Weaned and Adequately Children in the Study Sample Based on Weaning Time

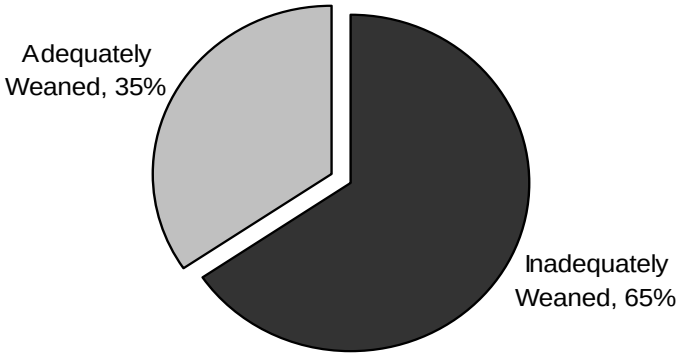

Chart 1: The above graph represents the percentage of mothers who inadequately weaned their children, which is defined as weaning the infant between birth and 6 months post-natal age, compared to the mothers who adequately weaned their children, ages 6 months and older. The study sample is limited to patients of MEWA Medical Centre in Mombasa Island and percentages are derived from a sample population of 58.

Chart 2: Infant Age at Initiation of Complementary Feeding

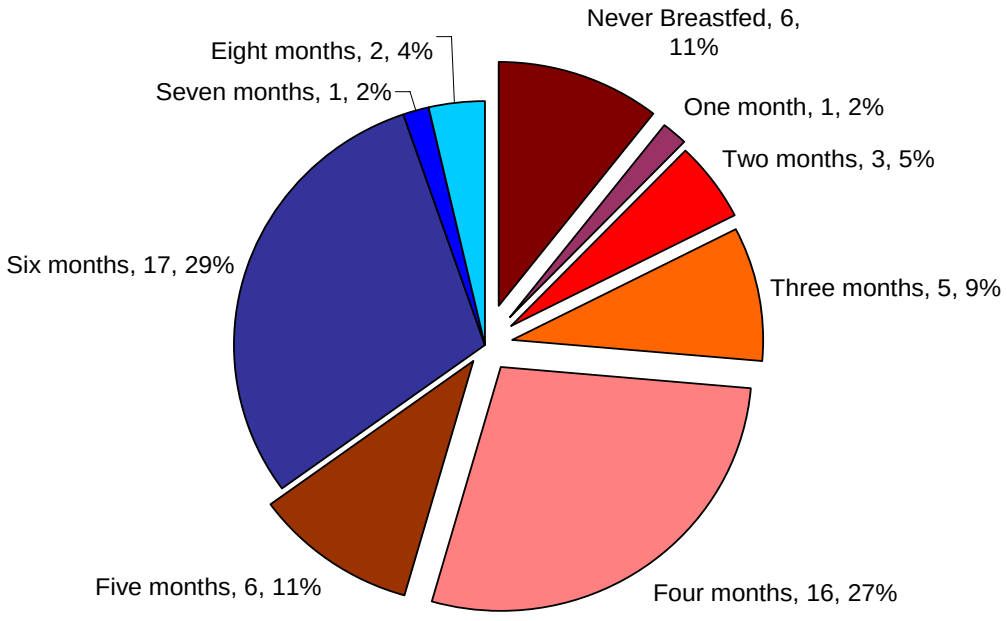

Chart 2: The above chart represents the percentages of the various age groups according to the post-natal age measured in months when the infants were weaned, or when complementary foods were introduced in the infant's diet as opposed to exclusively breast-milk. The separated slices demonstrate the inadequately weaned children, while the smaller, connected slices illustrate the adequately weaned children. Based on a sample size of 57.

Chart 3: The Increase of Illness in the Weanling of Mothers of the Sample Cohort Following the Initiation of the Complementary Feeding

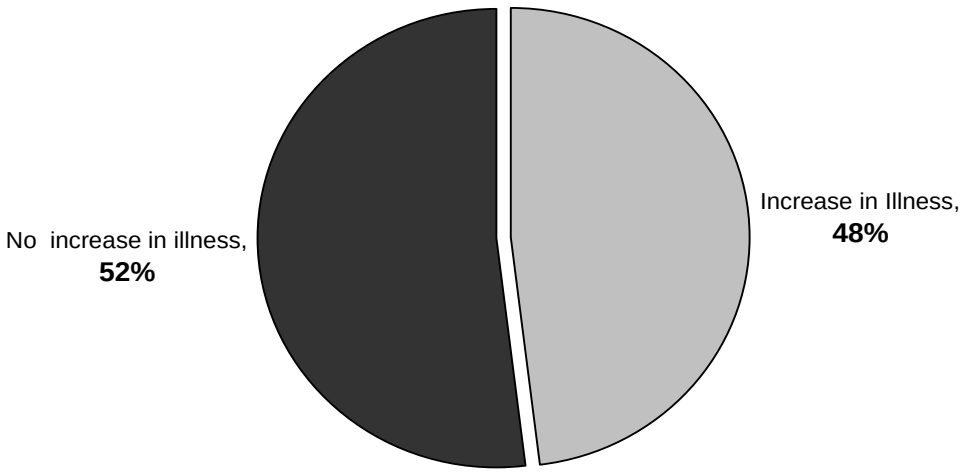

Chart 3: The above chart represents the percentages of mothers who observed their weaned children to have an increase in illness after the presentation of complementary foods in the infants' diets. The sample size is 54.

Chart 4: Representation of Illnesses Present Among Sample Cohort following Initiation of Complementary Foods

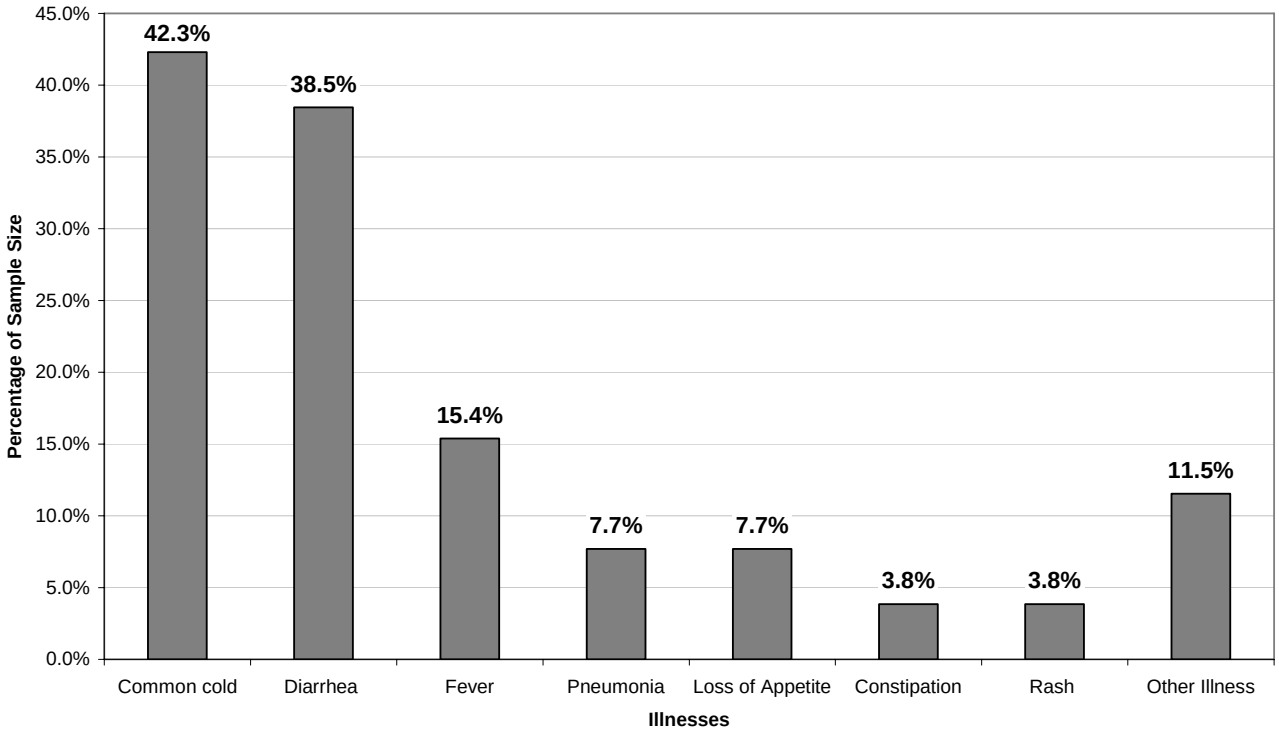

Chart 4: The above chart illustrates the relative presence of various illnesses mothers recognized in their children following the introduction of complementary foods in the infants' diets. Percentages are derived only from the mothers who observed an increased in illness of the weanling. The sample size is 26.

Chart 5: Representative Influences to Discontinue Exclusive Breastfeeding among the Sample Size

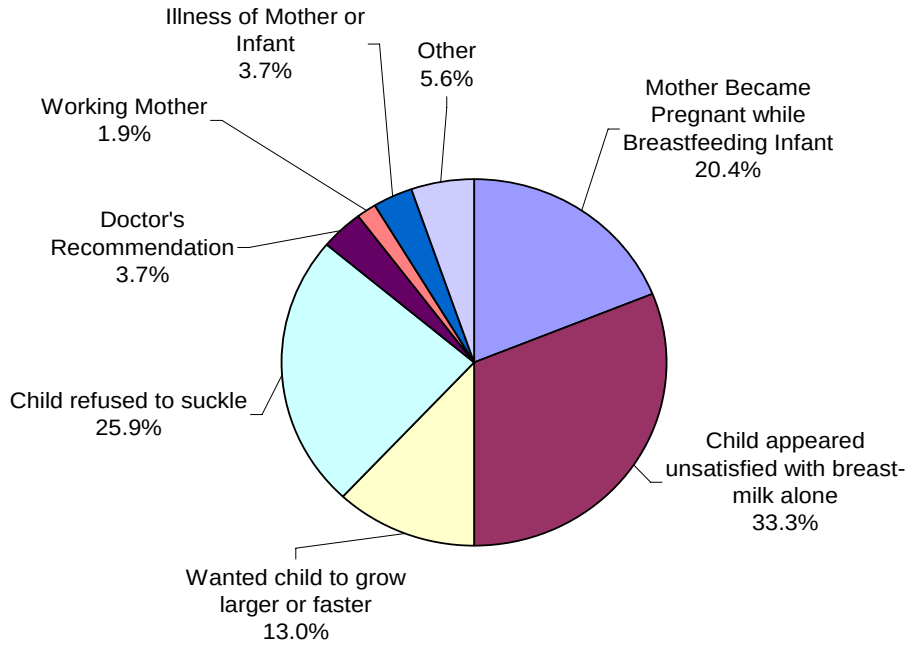

Chart 5: The above chart demonstrates the influences on all mothers of the sample cohort to completely stop breastfeeding or to initiate the weaning process. The sample size is 54. Some mothers noted more than one influence. See discussion for more details.

Chart 6: Representative Influences to Discontinue Exclusive Breastfeeding among the Sample Size of Mothers Who Inadequately Weaned

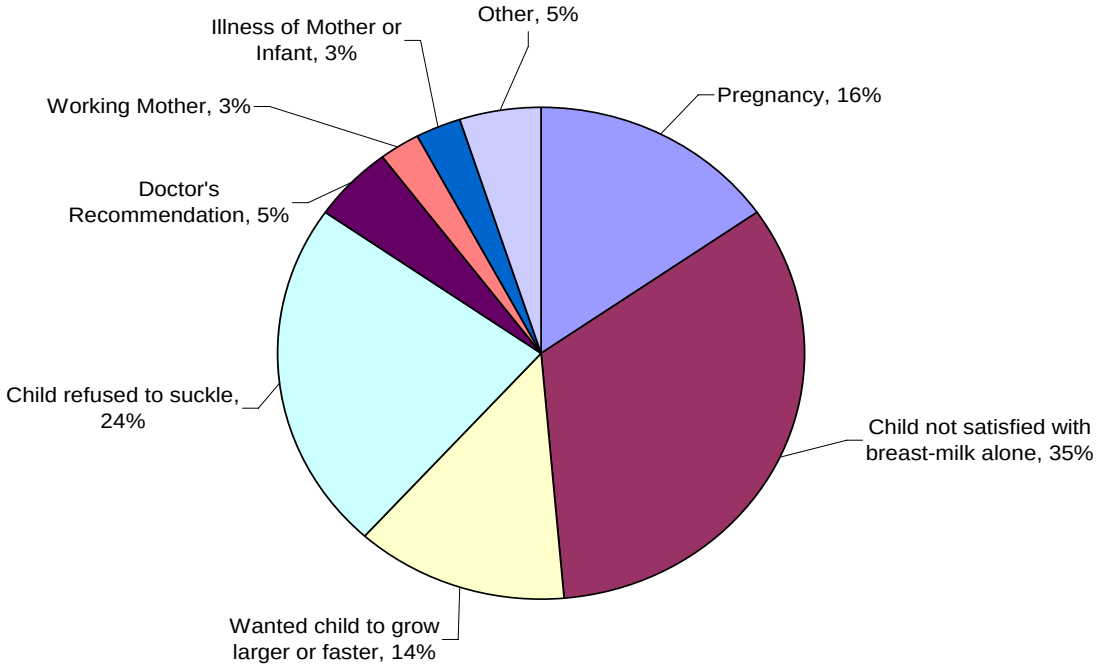

Chart 6: The above chart demonstrates the influences on mothers who inadequately weaned to completely stop breastfeeding or to initiate the weaning process. The sample size is 37. Some mothers noted more than one influence.

Chart 7: The Relationship between Education Level and Weaning Practices among the Sample Population

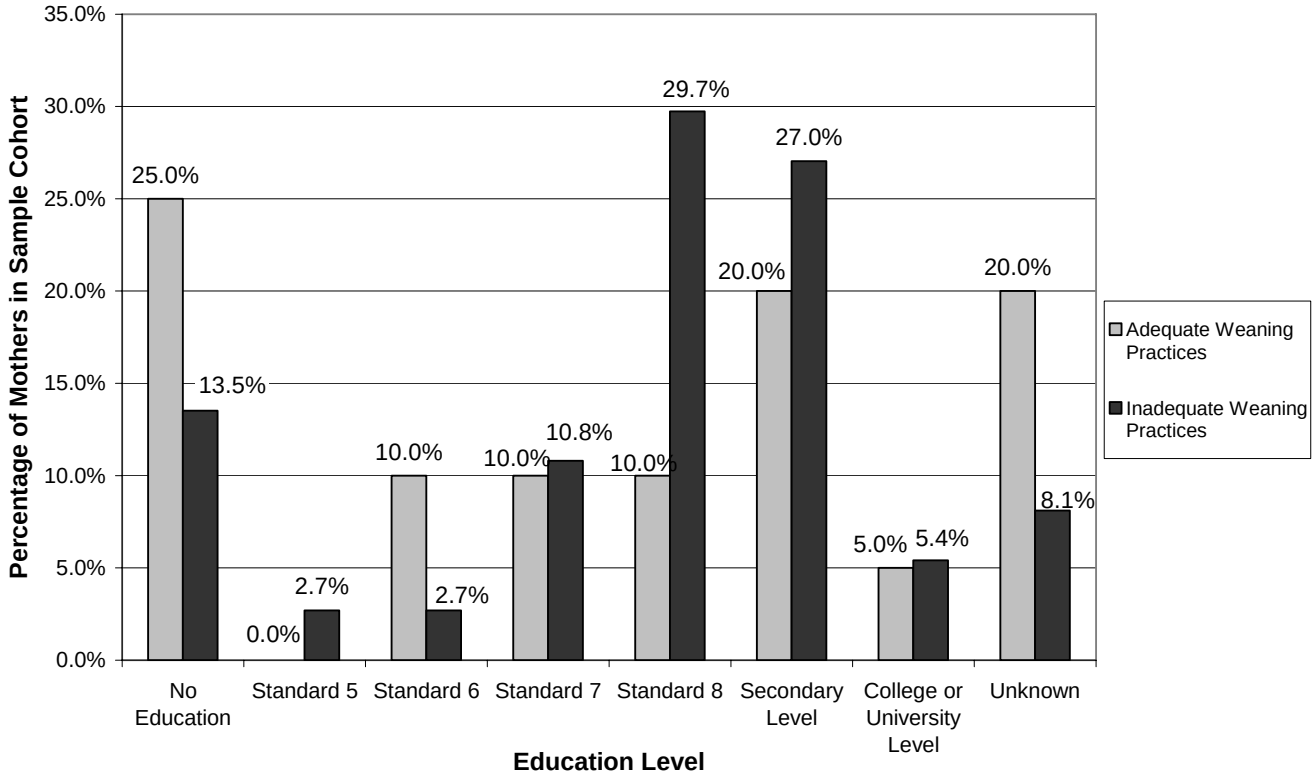

Chart 7: The above chart illustrates the relationship between education level and weaning practices of the mothers in the sample cohort. The percentages represent mothers for the respective cohort who received the specified level of education. The light gray bars represent mothers who adequately weaned, while the black bars represent mothers who inadequately weaned. The sample cohort is 57.

Chart 8: Increase in Illness among Inadequately Weaned Children of the Sample Population

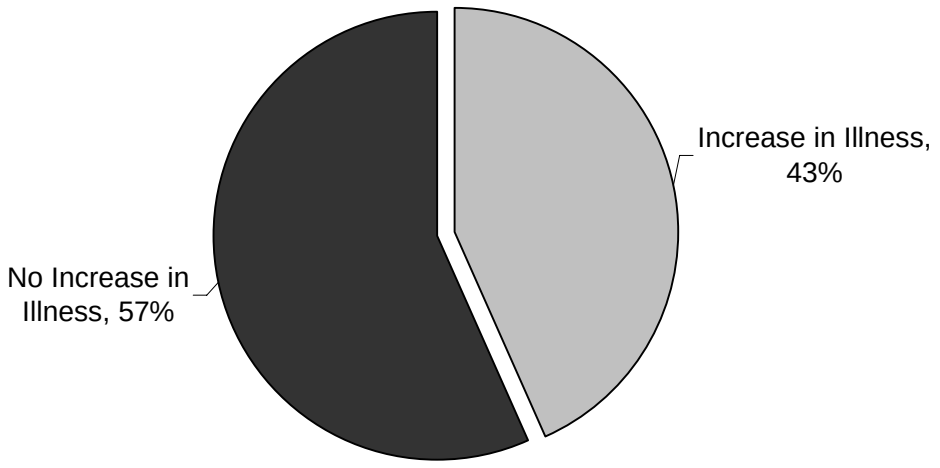

Chart 8: The above chart shows the percentages of mothers who inadequately weaned and observed an increase or no increase in illness of the weaned child. The sample size is 37.

Appendix 5:
Intervention Plan: Flyer for MEWA Medical Centre to distribute to expecting, first time or present mothers concerning breastfeeding.

Why Should You BREASTFEED Your Child?

Information about Breastfeeding

Breastfeeding provides the optimal nourishment for your infant. It has benefits no other foods, infant formulae, or milks can provide for your child. According to the World Health Organization and additional research, an infant can be exclusively breastfed for the first 6 months of life and still receive all his or her caloric and nutrient requirements. An infant should start to receive additional foods with sufficient nutrients, such as spinach, fruits and Cerelac, at 6 months, but continue to breastfeed. The infant can breastfeed for as long as two years and even beyond with complementary foods added to the diet. The following information illustrates benefits and misconceptions of breastfeeding.

Benefits Limited to Breastfeeding:

1. Breast milk provides antibodies and other properties necessary to protect your infant against illness.
2. Breastfeeding helps to establish a loving bond between you and you child.
3. Breastfeeding requires no (or minimal) expenses.
4. Breast milk is always clean and readily available on demand requiring no utensils, water or fuel.
5. Breastfeeding serves as a form of child spacing by inducing the absence of menses (also called lactational amenorrhea). NOTE: This may not occur for all mothers and requires exclusive breastfeeding to insure loss of periods.
6. Breast milk helps to protect your infant against allergies.
7. Breastfeeding encourages contraction of the womb so you can regain your figure quickly following birth.
8. Breastfeeding reduces the risk of ovarian and breast cancer in the mother.
9. Breastfeeding increases family and national resources.

Common Misconceptions about Breastfeeding:

1. I SHOULD NOT BREASTFEED WHILE I AM PREGNANT.

While some believe milk is soured during pregnancy and therefore not good for the nursing child, this is not supported by literature. Breastfeeding while pregnant will not harm the mother, infant or fetus.

2. INFANT FORMULAE AND ADDITIONAL FOODS WILL MAKE MY BABY GROW FASTER.

While it is true that your baby needs additional foods at 6 months of age and beyond, introduction to complementary foods prior to this period may actually

induce illness and ultimately lead to malnutrition. Many health care professionals and mothers see an increase in diarrhea and weight loss when the child is introduced to new foods. This is especially common among infants weaned prior to 6 months of age. At this time, the child is vulnerable to illness and should be closely observed and nurtured. Some mothers do observe an increase in weight of the weaned child; however, this is often due to overfeeding and can result in health problems such as obesity and hypertension later on in life.

3. MY CHILD IS NOT GETTING ENOUGH MILK AND HE OR SHE IS YOUNGER THAN 6 MONTHS OF AGE.

This is almost never the case. Even the underfed mother can often produce adequate amounts of milk for the nursing child. A child can exclusively breastfeed for 6 months and still receive everything he or she needs. Children go through stages of increased appetite during the first 6 months of life, especially the first 10-14 days, 5-6 weeks, and 3 months after birth. During these periods of hunger, a mother should feed as often as necessary and within two days the breasts will supply greater amounts of milk to meet the infant's needs. If other foods are given to the infant at this time, then the child will not drink enough breast milk to induce greater milk production, so it is essential the child is only fed breast milk during the growing period.

4. BREASTFEEDING RUINS MY FIGURE OR MAKES MY BREASTS SAG.

On the contrary, breastfeeding actually helps a mother regain her figure because it induces the womb to contract and uses body fat which may have been gained during pregnancy for milk production. Saggy breasts are caused by a lack of support and often result from enlargement and change of shape during pregnancy, but are not due to lactation. A supportive bra can help to prevent sagging.

***For the Muslim patients, the Holy Qur'an further promotes breastfeeding for a period of 2 years. Please refer to Holy Qur'an, Surah 46:15, 31:14 and 2:333.**

While breastfeeding obviously has a number of benefits, many mothers in the Mombasa District do not breastfeed their children exclusively for the first 6 months. A study performed illustrated that 65% of mothers prematurely wean their children in this region. To attempt to decrease this percentage and encourage breastfeeding, mothers must understand how to breastfeed and why breastfeeding is the best option for her and her child.

If you have any additional questions, please ask the Maternal and Child Health Clinic nurse or the maternity ward nurse of the MEWA Medical Centre. If you have HIV/AIDS, please talk with a nurse or health professional prior to breastfeeding.

FOR MORE INFORMATION PLEASE VISIT THE WORLD HEALTH ORGANIZATION'S WEBSITE AT **http://www.who.int/en/**

Flyer Compiled by Rachael Bryan for a study at MEWA Medical Centre

Intervention Flyer Translated into Kiswahili.

UMUHIMU WA KUMNYONYESHA MTOTO WAKO

Unyonyeshaji una umuhimu wa kumpatia mtoto vifaa bora kabisa vya kustawisha na kuurutubisha mwili wake. Kulingana na shirika la dunia la Afya (W.H.O) na pia kulingana na tafiti mbalimbali, mto anaweza kunyonyeshwa kwa miezi 6 ya kwanza, bila kutumia chakula chengine, na maziwa yale yakampatia mtoto virutubishi vya kutosha. Mtoto anahitajika kupata chakula cha ziada mbali ya maziwa ya mama, kama vile mboga, matunda na 'Cerelac' katika mwezi wa sita, lakini mama anahityajika aendelee kunyonyesha. Mtoto anaweza kunyonyeshwa kwa muda wa miaka 2 na zaidi, huku akipewa chakula cha ziada.

UMUHIMU WA MZIWA YA MAMA

1. Maziwa ya mama yanampa mtoto kingamwili na virutubishi ain aina, ambavyo humlinda mtoto kupata magonjwa.
2. Maziwa ya mama yanasaidia kuunganisha,kustawisha na kuimarisha mapenzi baina ya mama na mtoto
3. Maziwa ya mama hayana gharama
4. Maziwa ya mama ni safi, na daima yako tayari, hayahitaji vyombo,jiko au gesi.
5. Unyonyeshaji husaidia katika kupanga uzazi.
6. Unyonyeshaji hukinga mtoto dhidi ya magonjwa ya kuziza(allergies)
7. Unyonyeshaji unasaidia tumbo la mama kurudi hali yake ya zamani, na hivyo mama kuregesha umbo lake
8. Unyonyeshaji humkinga mama kupata magonjwa ya 'Ovari' na Kansa ya matiti
9. Unyonyeshaji unaongeza mapato ya familia na ya nchi kwa jumla

BAADHI YA FIKRA POTOSHI KUHUSU KUNYONYESHA

1) **SIFAI KUNYONYESHA NIKIWA NA MIMBA**

Watu wengi wanaamini kuwa maziwa ya mama huchachuka(huharibika) wakati ana ni mjamzito.Na hivyo husimamaisha kunyonyesha. Ukweli ni kuwa Tafiti zote hazijathibitisha fikra hii, na hivyo basi mama mja mzito anaweza kuendelea kumnyonyesha mwanawe, bila ya kumdhuru alo tumboni(kijusi).

2) **MAZIWA YA MIKEBE NA VYAKULA VINGINE VITAMFANYA MTOTO KUKUA HARAKA**

Ni kweli mtoto wako anahitaji chakula ziada anapotimia umri wa miezi 6, lakini kumpatia chakula mtoto wakati yupo chini ya miezi 6, kunaweza kumletea magonjwa na vile vile kumfanya awe na Utapiamlo(malnutrition). Madaktari na kina mama wengi wameona kuwa kuongezeka kwa kuharisha na kukonda kwa mtoto,pindi anapoanzishwa chakula kipya. Hii imedhihirika zaidi kwa mtoto wa chini ya umri wa miezi 6, wakati huu mtoto anaweza kupata magonjwa na hivyo ni sharti achunzwe kwa uangalifu mkubwa.

3) **MTOTO WANGU HAPATI MAZIWA YA KUTOSHA NA YEYE NI CHINI YA MIEZI 6**

Hili kwa kawaida haliwezekani kutokea. Kwani hata mama aso kula chakula cha kutosha,bado anaweza kutoa maziwa ya kutosha. Mtoto anawezakunyonya kwa miezi 6 bila ya kula chakula kingine na akapata mahitaji yote yanayohitajika kuujenga mwili wake. Tafiti zimeonyesha kuwa,watoto hupata njaa zaidi wakati wa miezi 6 yakwanza,haswa baina ya siku 10-14,na wiki 5-6, na miezi 3 baada ya kuzaliwa. Wakati huu mama anahitaji, amnyonyeshe mwanawe kila mara ,na baada ya siku mbili maziwa yake yatakuwa yakiongezeka.

4) **UNYONYESHAJI UNAHARIBU UMBO LANGU(FIGURE) NA KUANGUSHA MATITI YANGU**

Kinyume na fikra hii potoshi, unyonyeshaji unamsaidia mama kurudisha umbo lake(figure) kwa sababu inafanya tumbo lake kurudi hali yake ya kawaida. Matiti kuanguka husababishwa na kufura kwa matiti kwa ajili ya maziwa ya kunyonyesha. Sidirai inasaidia kuzuia kuanguka kwa matiti.

Iwapo una swali lolote, tafadhali ongea na daktari au matron wa MEWA medical Centre. Na iwapo una virisi vya ukimwi, tafadhali ongea na daktrai kabla kunyonyesha.

***Kwa maelezo zaidi* http://www.who.int/en/**